IN THE CLAIMS:

Please amend the claims as follows.

A complete listing of all the claims is as follows:

Claims 1 to 86. (Canceled).

Claim 87. (Previously Presented).

Procedure for the determination of the quality of gas of a probe gas, proceeding from a transmission spectrum of the probe gas determined at operating conditions by means of spectroscopical methods of measurement, comprising

- determining at operating conditions out of the transmission spectrum the amounts of substances $x_i$ of the components of the probe gas,

- presetting default values for a compressibility factor K and real gas factor $Z_n$ for calculation of the compressibility factor K,



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- out of quantities at operating conditions of the probe gas as well as from the amounts of substances $x_i$ and substance specific quantities and taking into account of the preset default values for compressibility factor K and real gas factor $Z_n$ determining input quantities for the determination of the compressibility factor K,

- calculating with these input quantities the compressibility factor K by means of a standard-arithmetic procedure,

- carrying out an iterative calculation in the way of an iterative recalculation of the input quantities with the determined value for the compressibility factor K, until the value of the compressibility factor K converges and then from the volumetric standard calorific value $H_{v,n}$, the standard density $\rho_n$ is calculated.

Claim 88. (Previously Presented).

The procedure according to claim 87, wherein as standard-arithmetic procedure the method of iteration AGA8-92DC is used.



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Claim 89. (Previously Presented).

The procedure according to claim 87, wherein as standard-arithmetic procedure the method of iteration GERG88 is used.

Claim 90. (Previously Presented).

The procedure according to claim 87, wherein the amounts of substances $x_i$ of infrared active components of the probe gas at operating conditions is determined starting from the recorded transmission spectrum by means of multivariate analysis (MVA).

Claim 91. (Previously Presented).

The procedure according to claim 87, wherein the default values of the compressibility factor K and the real gas factor $Z_n$ are and taken from a characteristic diagram, that describes the influence of the pressure $p_b$ at operating conditions and the temperature $T_b$ at operating conditions for a known composition of a gas similar to the composition of the probe gas.



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Claim 92. (Currently Amended).

The procedure according to claim 87, wherein directly from the transmission spectrum the amounts of substances of ~~the~~ infrared active components of the probe gas at operating conditions and the amount of nitrogen $N_2$ of the probe gas are determined as a function of the amounts of substances of the infrared active components of the probe gas.

Claim 93. (Previously Presented).

The procedure according to claim 92, wherein the amount of substance of nitrogen $N_2$ and the amounts of substances of the infrared active components complements each other resulting in the total volume of the probe gas.

Claim 94. (Previously Presented).

Procedure for the determination of the quality of gas of a probe gas proceeding from a transmission spectrum of the probe gas determined at operating conditions by means of spectroscopical methods of measurement, comprising,



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- presetting default values for compressibility factor K and real gas factor $Z_n$ for calculation of the wanted compressibility factor K,

- from the pressure $p_b$ at operating conditions and the temperature $T_b$ at operating conditions of the probe gas with the values for the calorific value $H_{v,b}$ at operating conditions and the density $\rho_b$ at operating conditions, which can be directly determined out of the spectrum, determining input quantities for the determination of the compressibility factor K,

- as further input quantity determining the molar amount of substance of $CO_2$ by means of a further absorption band of the spectrum,

- with these input quantities calculating the compressibility factor K by means of the iterational procedure GERG88,

- carrying out an iterative calculation in the way of an iterative recalculation of the input quantities with the determined value for the compressibility factor K,



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until the value of the compressibility factor K converges and then from the volumetric standard calorific value $H_{v,n}$ the standard density $\rho_n$ is calculated.

Claim 95. (Previously Presented).

The procedure according to claim 94, wherein the calorific value $H_{v,b}$ at operating conditions and the density $\rho_b$ at operating conditions are determined by means of spectral functions for weighting of a value directly from the transmission spectrum of the probe gas.

Claim 96. (Currently Amended).

The procedure according to claim 95, wherein with the spectral functions for weighting of a value the weighted influence of the amounts of substances of the components of the probe gas is described for the calorific value $H_{v,b}$ at operating conditions and the density $\cancel{x_b}$ $\underline{\rho_b}$ at operating conditions.



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Claim 97. (Previously Presented).

The procedure according to claim 95, wherein the default values for compressibility factor K and real gas factor $Z_n$ are taken from a characteristic diagram, that describes the influence of the pressure $p_b$ at operating conditions and the temperature $T_b$ at operating conditions for a known composition of a gas similar to the composition of the probe gas.

Claim 98. (Currently Amended).

Photometric device for the determination of a transmission spectrum of a probe gas comprising

a radiation source emitting a measurement radiation, in which the measurement radiation passes through a probe cell for capturing a probe gas and enters after passing through a modulation unit for modulating the measurement radiation into at least one radiation receiver, which generates electrical measurement signals according to an incoming intensity of the measurement radiation and transmits these to an electronical unit, which determines said transmission spectrum out of the measurement signals, wherein the modulation unit shows a spectral



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switch unit in the form of a chopper arrangement, which transmits because of their selective transmission behaviour only specific spectral regions of the transmission spectrum in the measurement radiation caused by the probe gas to the <u>at least one</u> radiation receiver; and

wherein the chopper arrangement is provided with an aperture with a spiral opening in which the release of the regions of the wavelength of the measurement radiation is caused continuously for the whole spectrum.

<u>Claim 99. (Previously Presented).</u>

The photometric device according to claim 98, wherein the chopper arrangement provides such a transmission spectrum that the transmitted spectral regions are suitable for the further evaluation by procedures of the direct spectral evaluation (DSA).

<u>Claim 100. (Previously Presented).</u>

The photometric device according to claim 98, wherein the release of the regions of the wavelength of the measurement radiation, which passes through the chopper arrangement, can be



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obtained by means of capturing the rotational position of the aperture.

Claim 101. (Previously Presented).

The photometric device according to claim 98, wherein the chopper arrangement is provided with two groups of sector elements alternatively releasing the measurement radiation, in which a first optical waveguide guides the measurement radiation released by the sector elements of the first sector element group into the probe cell and after passing through the probe cell to the radiation receiver and a second optical waveguide guides the measurement radiation released by the sector elements of the second sector element group directly to the radiation receiver.

Claim 102. (Previously Presented).

The photometric device according to claim 101, wherein the measurement radiation released by the sector elements of the first and second sector element groups are concentrated by means of said first optical waveguide and said second optical waveguide into one or more filters or a dispersive element, or a monochromator.



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Claim 103. (Previously Presented).

The photometric device according to claim 102, wherein the radiation receiver collects the measurement radiation, which is coming out of the one or more filters or the dispersive element and each released through the sector elements of the sector element groups of both optical waveguides.

Claim 104. (Previously Presented).

The photometric device according to claim 101, wherein the measurement radiation, which is released through the sector elements of the sector element groups of that first optical waveguide, which is guided directly to the radiation receiver, is usable as reference for eliminating the influence of $CO_2$, which exists in the surrounding of the probe cell and/or of the photometric device, of changes of the radiation source and/or of the radiation receiver.

Claim 105. (Currently Amended).

The photometric device according to claim 101, wherein the measurement radiation, which is each released through the sector



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elements of the first and second sector element groups, is guided through the first and the second optical waveguide ~~(34, 35)~~ to the input of one or more filters or a dispersive element, in which at the chopper arrangement ~~(28)~~ also available sector element groups lock on the measurement radiation, which is released of the one or more filters or the dispersive element, alternatively to the radiation receiver.

Claim 106. (Previously Presented).

The photometric device according to claim 102, wherein the measurement radiation, which is each released through the sector elements, is guided together by means of the first and the second optical waveguides in a Y-fibre coupler, which guides the measurement radiation of the first and the second waveguide to the one or more filters or the dispersive element.

Claim 107. (Previously Presented).

The photometric device according to claim 105, wherein the chopper arrangement carries out both the selection of the wavelengths for the transmission spectrum as well as the



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alternating reverse of the measured section between the first and second optical waveguides.

Claim 108. (Currently Amended).

The photometric device according to claim 101, wherein the probe cell is sweepable with an infrared inactive gas, ~~preferably nitrogen $N_2$ for carrying out a null measurement~~ for the compensation of dirt accumulation of the optical facilities of the photometric device.



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